U.S. Environmental Protection Agency
Region IX

Total Maximum Daily Load for Trash Ballona Creek and Wetland

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Date

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SECTION 1: INTRODUCTION

The Ballona Creek and Wetland Total Maximum Daily Load (TMDL) for Trash is being established in accordance with Section 303(d) of the Clean Water Act, because the State of California has determined that the water quality standards for the Ballona Creek and Wetland are exceeded due to trash. In accordance with Section 303(d), the State of California periodically identifies "those waters within its boundaries for which the effluent limitations . . . are not stringent enough to implement any water quality standard applicable to such waters." In its 1996 and 1998 303(d) lists, the Los Angeles Regional Water Quality Control Board (Regional Water Board) identified the Ballona Creek and Wetland as impaired due to trash.

In accordance with a consent decree (*Heal the Bay, Inc. Santa Monica Baykeeper, Inc. et.al. v. Browner & Marcus*, No. 98-4825, March 22, 1999), March 22, 2002 is the deadline for establishment of this TMDL. This EPA TMDL is largely based on the trash TMDL for the Ballona Creek and Wetland adopted by the Regional Board, which the California State Water Resource Control Board (State Board) is in the process of adopting. The State TMDL was adopted by the Regional Water Quality Control Board – Los Angeles Region on September 19, 2001 and by the State Board on February 19, 2002. However, State procedures require the State TMDL to now be reviewed by the Office of Administrative Law. Because the State will not be able to complete adoption of the trash TMDL for the Ballona Creek and Wetland by the March 22, 2002 deadline, EPA is establishing this TMDL to fulfill its legal obligations, based largely on the efforts of the Regional Water Board staff 2001 (Los Angeles Regional Board 2001a[1]). EPA anticipates that the State will continue its process for adoption of the State TMDL, and will submit that TMDL to EPA for approval later this year. At that time, EPA will review the State submitted TMDL to determine if it meets all TMDL requirements. If EPA approves the State Board's adopted TMDL, it will supersede this EPA TMDL.

The purpose of a TMDL is to identify the total load of a pollutant which a waterbody can receive without causing exceedances of Water Quality Standards, and to allocate the total load among the sources of the pollutant in the watershed. Although this TMDL does not include an implementation plan, EPA endorses the TMDL implementation strategy adopted by the Regional Board on September 19, 2001 and by the State Board on February 19, 2002 which will result in implementation of the TMDL in accordance with the provisions in 40 CFR 130.6. The waste load allocations and load allocations, when implemented, are expected to result in the attainment of the applicable water quality objectives for trash for the Ballona Creek and Wetland.

1.1. Watershed Characteristics

Ballona Creek flows slightly over 10 miles from Los Angeles (South of Hancock Park) through Culver City, reaching the ocean at Playa del Rey. Except for the estuary of Ballona Creek[2], which is trapezoidal and composed of grouted rip-rap side slopes and an earth bottom, Ballona Creek is entirely lined in concrete and extends into a complex underground network of stormdrains which reaches to Beverly Hills and West Hollywood, draining 130 square miles of highly developed land, with both residential and commercial land uses. Tributaries of Ballona Creek include Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous other storm drains. All of these tributaries are either concrete channels or covered culverts. Cities on this small coastal watershed are Culver City, Beverly Hills, West Hollywood, parts of Santa Monica, parts of Inglewood, parts of Los Angeles, and some unincorporated

[1] Los Angeles Regional Board Staff Report: Trash Total Maximum Daily Loads for the Ballona Creek and Wetland, September 19, 2001.

[2] The estuary reaches up to Centinela Boulevard. Ballona Creek is concrete-lined upstream of Centinela Boulevard, as cited in Los Angeles Regional Board 2001a.

areas of Los Angeles County.

Adjacent to the downstream channel of Ballona Creek are the Marina del Rey Harbor, Ballona Lagoon and Venice Canals, Del Rey Lagoon and Ballona Wetlands. Although they do not discharge directly into the Creek, they are grouped as waterbodies in this subwatershed because of their proximity and various forms of hydrological connection to Ballona Creek.

EPA is not including the Marina del Rey harbor, Ballona Lagoon and Venice Canals, or Del Rey Lagoon in the final Ballona Creek & Wetland trash TMDL because they are not listed for trash impairment on the 303(d) list.

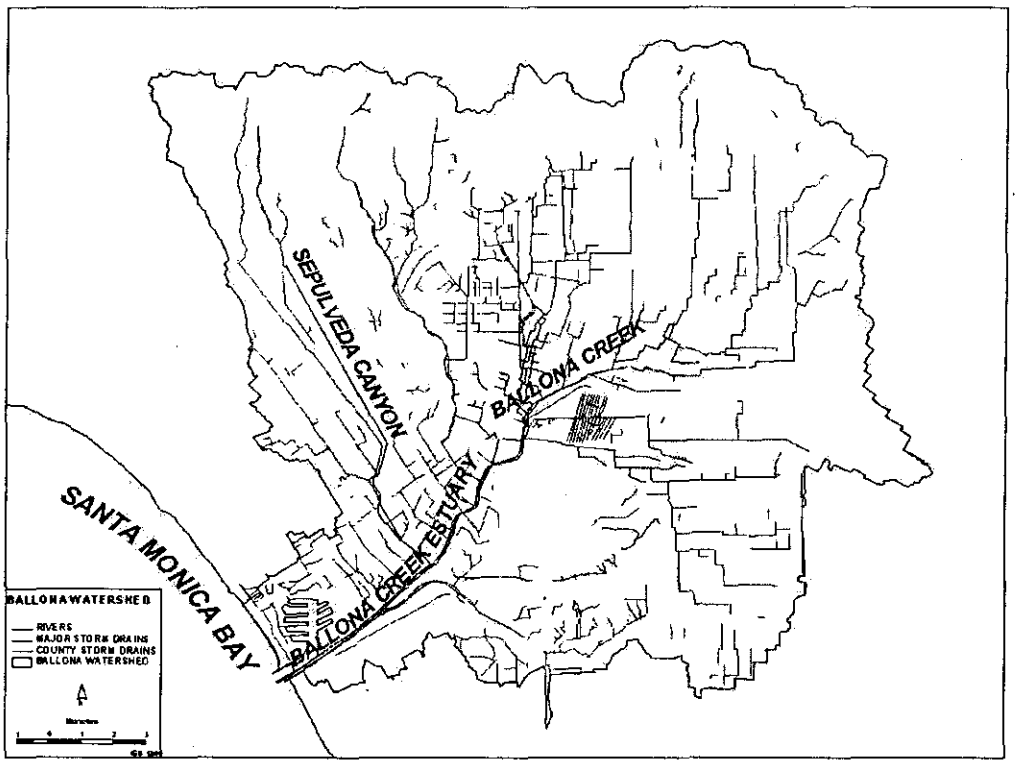

Figure 1-1. Waterbodies in Ballona Creek Watershed.

While at one time it drained into a large wetlands complex[3], since its channelization by the US Corps of Engineers in 1935, Ballona Creek has lost its direct connection to the Ballona Wetlands in spite of the tidal gates which connect both ecosystems. Ballona Creek has been designated as a Significant Ecological Area within the Los Angeles County in its general plan (Los Angeles County, 1976). Although Ballona Creek and the Ballona Wetlands used to share a 2100-acre coastal estuary, the degraded wetlands that remain encompass only 186 acres.

[3] Ballona Creek and the Ballona Wetlands used to be home to the Gabrielino and Shoshonean peoples. The Ballona Wetlands have been considered sacred ground by native peoples for thousands of years, as cited in Los Angeles Regional Board 2001a.

1.2. Information Sources

This TMDL is largely based on the Trash Total Maximum Daily Loads for the Ballona Creek and Wetland prepared by California Regional Water Quality Control Board – Los Angeles Region, dated September 19, 2001 (Los Angeles Regional Board 2001a). The Regional Water Board staff used available data/information on the Ballona Creek and Wetland from a variety of sources in the development of the TMDL. This TMDL further clarifies EPA's position on numerous issues raised by commentors during the public comment period of EPA's December 5, 2001 draft TMDL.

1.3. Organization

This report is divided into sections. Section 2 (Problem Statement) describes the nature of the environmental problem addressed by the TMDL. Section 3 (Numeric Target) identifies the numeric target to be used to evaluate whether the Ballona Creek and Wetland is attaining water quality standards. Section 4 (Source Analysis) describes what is currently understood about the sources of trash impairment in the identified waterbodies. Section 5 (TMDLs and Allocations) identifies the total load of trash that can be delivered to the Ballona Creek and Wetland without causing violation of water quality standards, and describes how the total load will be apportioned. Section 6 (Implementation and Monitoring Recommendations) contains State's recommendations regarding implementation and monitoring of the TMDL. Although this EPA TMDL does not include implementation measures, the State's implementation recommendations, which EPA supports, are included for information. Section 7 (Public Participation) describes public participation in the development of the TMDL.

SECTION 2: PROBLEM STATEMENT

This section summarizes how trash is impairing the beneficial uses of the Ballona Creek and Wetland. It includes a description of the water quality objectives, designated beneficial uses, and detailed assessment of the extent of the trash impairment in the Ballona Creek and Wetland.

In this TMDL, "trash" is defined as man-made litter, as defined in California Government Code Section 68055.1(g):

> "Litter means all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and waters of the state, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling or manufacturing [....]."

For purposes of this TMDL, we will consider trash to consist of litter and particles of litter that are retained by a 5-mm mesh screen. These particles of litter are referred to as "gross pollutants" in European and Australian scientific literature. This definition excludes sediments, and it also excludes oil and grease, and vegetation, except for yard waste that is illegally disposed of in the storm drain system.

2.1. Water Quality Standards

In accordance with the Clean Water Act, TMDLs are set at levels necessary to implement the applicable water quality standards. Under the Clean Water Act, water quality standards consist of designated uses, water quality criteria to protect the uses, and an antidegradation policy. The State of California uses

slightly different language (i.e., beneficial uses, water quality objectives, and a non-degradation policy). They are defined in the Regional Water Quality Control Plans (Basin Plans). This section describes the State water quality standards applicable to the Ballona Creek and Wetland TMDL using the State's terminology. The remainder of the document simply refers to water quality objectives.

Occurring in solid form as floatable or settleable material(s), trash is a type of "floating materials" and "solid, suspended, or settleable materials" as defined in the Basin Plan. The narrative water quality objectives applicable to this TMDL are for **floating material**: *"Waters shall not contain floating materials, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses"*[4] and **solid, suspended, or settleable material:** *"Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses."*[5]

The Regional Board has determined that these water quality standards are not being met due to adverse effects of trash on the beneficial uses.

2.1.1 Beneficial Uses of the Watershed

A brief description of the beneficial uses most likely to be impaired due to trash in the Ballona Creek and Wetland is provided in this section.

Beneficial uses impaired by trash in the Ballona Creek and Wetland include Water Contact Recreation (REC1), Non-Contact Recreation (REC2), Warm Freshwater Habitat (WARM), Wildlife Habitat (WILD). Other beneficial uses impaired by trash are estuarine habitat (EST); rare, threatened or endangered species (RARE); migration of aquatic organisms (MIGR) and spawning, reproduction and early development of fish (SPWN); and Wetland Habitat (WET). Ballona Creek is fenced off from riparian access on all of its length, but children are regularly observed playing in the Creek during hot afternoons. Families of ducks are also frequently observed at many points on the creek. The bicycle path shaded in places by riparian trees along the creek is used extensively. In addition, several federal and state listed endangered species inhabit the Ballona Wetlands Ecosystem, including the Southwestern Willow Flycatcher. Overall, the biological community in Ballona Creek contains an abundance of a few species, but is low in diversity, other than the benthic community near the mouth of the creek.[6]

Beneficial uses of Ballona Creek and Wetland are summarized in Table 1, excerpted from the 1994 Basin Plan. These are the designated beneficial uses that must be protected[7].

Table 1. Beneficial Uses of Surface Waters of Ballona Creek and Ballona Wetland

	Hydro Unit	MUN#	NAV	REC1	REC2	COMM	WARM	EST	MAR	WILD	RARE	MIGR	SPWN	SHELL	WET[b]
Ballona Wetlands	405.13			E	E			E		E	E[e]	E[f]	E[f]		E
Ballona Creek	405.15	P*		Ps	E		P			E					

Beneficial use designations apply to all tributaries to the indicated waterbody, if not listed separately.

E: Existing beneficial use

[4] Water Quality Control Plan ("Basin Plan"), p. 3-9.
[5] Ibid., pp. 3-16.
[6] U.S. Army Corps of Engineers Los Angeles District, Marina del Rey and Ballona Creek Feasibility Study Sediment Control Management Plan, 2000.
[7] Water Quality Control Plan, Los Angeles Region, California Regional Water Quality Control Board, Los Angeles Region, 1994, p. 2-10.

P: Potential beneficial use
s: Access prohibited by Los Angeles County DPW
*: Asterixed MUN designations are designed under SB88-63 and RB 89-03. Some designations may be considered from exemptions at a later date.
#: Pursuant to EPA's decision dated February 15, 2002, EPA notes that the waters identified with an asterisk (*) do not have MUN as designated use until such time as the State undertakes additional study and modifies its Basin Plan. (See USEPA Region 9 2002c).
[b] Waterbodies designated as WET may have wetlands habitat associated with only a portion of the waterbody. Any regulatory action would require a detailed analysis of the area.
[e] One or more rare species utilize all ocean, bays, estuaries,
[f] Aquatic organisms utilize all bays, estuaries, lagoons and coastal wetlands, to a certain extent, for spawning and early development. This may include migration into areas which are heavily influenced by freshwater inputs.

BENEFICIAL USE CODES (see Basin Plan for more details):

MUN - Municipal and Domestic Water Supply	EST – Estuarine Habitat
REC1 - Water Contact Recreation	WILD – Wildlife Habitat
REC2 - Non-Contact Water Recreation	RARE – Rare, Threatened or Endangered Species
COMM - Commercial and Sport Fishing	SPWN – Spawning, Reproduction, and/or Early Development
WARM - Warm Freshwater Habitat	SHELL – Shellfish Harvesting
COLD - Cold Freshwater Habitat	WET – Wetland Habitat
MAR - Marine Habitat	MIGR – Migration of Aquatic Organism

2.2. Impairment of Beneficial Uses

The Regional Board has determined that the narrative water quality objectives for floating materials and for solid, suspended, or settable materials are not being met due to the adverse effects of trash on the existing and potential beneficial uses. Existing beneficial uses impaired by trash in Ballona Creek and Wetland are contact recreation (REC 1) and non-contact recreation such as fishing (REC 2) (trash is aesthetically displeasing and deters recreational use and tourism)[8,9]; wildlife habitat (WILD); estuarine habitat (EST); rare, threatened or endangered species (RARE); migration of aquatic organisms (MIGR) and spawning, reproduction and early development of fish (SPWN); and wetland habitat (WET). Potential beneficial use impaired by trash in Ballona Creek is warm fresh water habitat (WARM). These beneficial uses in Ballona Creek and Wetland are impaired by large accumulations of suspended and settled debris. Common items that have been observed by Regional Board staff include Styrofoam cups, Styrofoam food containers, glass and plastic bottles, toys, balls, motor oil containers, antifreeze containers, construction materials, plastic bags, and cans. Heavier debris can be transported during storms as well.

Trash in waterways causes significant water quality problems and adversely affects the beneficial uses as discussed above. For example, small and large floatables can inhibit the growth of aquatic vegetation, decreasing spawning areas and habitats for fish and other living organisms. Wildlife living in rivers and in riparian areas can be harmed by ingesting or becoming entangled in floating trash[10]. Except for large items such as shopping carts, settleables are not always obvious to the eye. They include glass, cigarette butts, rubber, construction debris and more. Settleables can be a problem for bottom feeders and can contribute to

[8] National Oceans Conference (1998) Turning to the Sea: America's Ocean Future.
[9] UCLA Environmental Law Clinic, 2001. Los Angeles Regional Board Hearing Transcript Excerpts on Los Angeles River Trash TMDL (Jan. 25, 2001).
[10] US Environmental Protection Agency (US EPA) Office of Water. (2001) Assessing and Monitoring Floatable Debris – Draft.

sediment contamination. Some debris (e.g. diapers, medical and household waste, and chemicals) are a source of bacteria and toxic substances. Floating debris that is not trapped and removed will eventually end up on the beaches or in the open ocean, repelling visitors away from our beaches and degrading coastal waters.

A major trash problem experienced in Ballona Creek and Wetland contributes to a broader phenomenon that affects ocean waters, as small pieces of plastic called "nurdles" (defined as pre-production virgin material from plastic parts manufacturers, as well as post-production discards that are occasionally recycled) float at various depths in the ocean and affect organisms at all levels of the food chain. As sunlight and UV radiation render plastic brittle, wave energy pulverizes the brittle material, with a subsequent chain of nefarious effects on the various filter feeding organisms found near the ocean's surface. Studies in the North Pacific indicate that both large floating plastic and smaller fragments are increasing. As a result of increased reports of resin pellet ingestion by aquatic wildlife and evidence that the ingested pellets are harming wildlife, the Interagency Task Force on Persistent Marine Debris (ITF) identified resin pellets, also know as plastic pellets, as a debris of special concern.[11] When released into the environment, these pellets either may float on or near the water surface, may become suspended at mid-depths, or may sink to the bottom of a water body. Whether a specific pellet floats or sinks depends on the type of polymer used to create the pellet, on additives used to modify the characteristics of the resin, and on the density of the receiving water.

A 1999 study of Marine Debris in the Mid-Pacific Gyre in an attempt to assess the potential effects of ocean particles on filter feeding marine organisms, collected plankton samples at various locations throughout the gyre. The results were stunning: the mass of plastic particles collected was six times higher than the mass of plankton (841 g/km^2), although the number of planktonic organisms (1,837,342/km^2) was five times the number of plastic pieces. The distribution of the sampling points allows one to assume that these numbers can be safely extrapolated to the breadth of the Mid-Pacific Gyre. A remarkable finding was that the number of particles did not increase in successively smaller size classes as expected, indicating there may be non-selective removal by mucus web-feeding jellies and salp. In this study, the most common type of identifiable particle, thin plastic film, accounted for 29% of the total. Many birds will die from ingesting this non-nutritive plastic.[12]

The prevention and removal of trash in Ballona Creek and Wetland ultimately will lead to improved water quality and protection of aquatic life and habitat, expansion of opportunities for public recreational access, enhancement of public interest in the waterbodies and public participation in restoration activities, and enhancement of the quality of life of riparian residents.

2.3. Extent of the Trash Problem in Ballona Creek and Wetland

Trash is a water quality problem at Ballona Creek and Wetland. The Regional Board has determined that current levels of trash exceed the existing Water Quality Objectives necessary to protect the beneficial uses of the river in the Ballona Creek and Wetland.

For many years, Los Angeles County and other cities have recognized that trash is a problem and continuously implement controls to abate the problem (e.g. some elements in the stormwater program).[13]

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[11] US Environmental Protection Agency (US EPA) (1992) Plastic Pellets in the Aquatic Environment: Sources and Recommendations, as cited in Los Angeles Regional Board 2001a.

[12] Moore, C.J. et al. Marine Debris in the North Pacific Gyre, 1999, with a Biomass Comparison of Neustonic Plastic and Plankton. (in preparation), as cited in Los Angeles Regional Board 2001a.

[13] See comments from Los Angeles County, Agoura Hills, Artesia, Beverly Hills, Hermosa Beach, Hidden Hills, Carson, Diamond Bar, La Habra Heights, La Mirada, La Puente, Monrovia, Norwalk, Rancho Palos Verdes, Rolling Hills, San Fernando, San Marino, West Hollywood, Westlake Village, and the Executive Advisory Committee (Stormwater Program - Los Angeles County) on behalf of all the Los Angeles County cities, submitted in response to

The Los Angeles County Department of Public Works is reporting a "30% decrease in roadway trash on unincorporated County roads and a 50% decrease in trash entering catchbasins since adoption of the current National Pollutant Discharge Elimination System (NPDES) Permit".[14] However, trash in Ballona Creek and Wetland continues to be a serious problem.

Every city in the watershed agrees that the amount of trash found in the waterways is excessive. Regional Board staff regularly observe trash in the waterways of this watershed. Non-profit organizations such as Santa Monica BayKeeper or Heal the Bay, and others, organize volunteer clean-ups periodically, and document the amount of trash that was removed on such days, but these data do not indicate how long the trash had been accumulating at that particular site, only the amount that was picked up by the volunteers on a given day.

For example, at Coastal Clean-up Day in 1996, 26,300 lbs of trash were collected in Los Angeles County. During the September 18, 1999, California Coastal Clean up organized by Heal the Bay, a total of 60,711 lbs of trash were collected in Los Angeles County[15].

Earthday clean ups results in large amounts of trash being removed from the Creek. Meanwhile, the purpose of volunteer clean-ups is to visibly clean the river and its banks, not to quantify debris. As a result, it is likely that some of the debris collected during those events are not recorded. In addition, volunteers traditionally focus on larger, more visible debris to the exclusion of smaller debris which are commonly encountered, such as cigarette butts. Table 2 shows the tonnage of trash collected at 3 sites along Ballona Creek. These figures show a portion of the trash existing along the creek.

Table 2. Ballona Creek Tonnage: Yearly Tonnage[16]

<u>In conjunction with Coastal Clean Up Day</u>	
September 1994	32.8 tons
September 1995	20 tons
September 1996	24.94 tons
September 1997	unknown
September 1998	20 tons
September 1999	17 tons
September 2000	18.67 tons
<u>In conjunction with Earth Day</u>	
April 1995	7 tons
April 1996	8.74 tons
April 1997	21.67 tons
April 1998	3.5 tons
April 1999	7 tons
April 2000	8 tons

Several studies which attempted to quantify trash generated from discreet areas have been completed, but these concern relatively small areas, or relatively short periods, or both. The findings of some of these studies are discussed below.

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the first draft of this Trash TMDL for the Los Angeles River Watershed, as cited in Los Angeles Regional Board 2001a.

[14]Comment letter from County of Los Angeles, Department of Public Works, May 15, 2000, p. 1, as cited in Los Angeles Regional Board 2001a.

[15] Alix Gerosa, Heal the Bay, November 22, 1999, as cited in Los Angeles Regional Board 2001a.

[16] City of Culver City, as cited in Los Angeles Regional Board 2001a.

The City of Calabasas cleaned out the Continuous Deflective Separation (CDS) Unit they had installed in December of 1998, on September 28, 1999. This CDS unit, located in Calabasas at the intersection of Las Virgenes Road and Agoura Road, collects trash from the runoff of a small storm drain, as well as part of the runoff from Calabasas Park Hills (Santa Monica Mountains), and eventually empties to Las Virgenes Creek. It is assumed that this CDS unit prevented all trash from passing through. The calculated area drained by this CDS Unit, as provided to the Regional Board by Los Angeles County Department of Public Works staff, amounts to 12.8 square miles. The urbanized area was estimated by Regional Board staff to amount to 0.10 square miles of the total area. The result of this clean-out, which represents approximately half of the 1998-1999 rainy season, was 2,000 gallons of sludgy water and a 64-gallon bag about two-third full of plastic food wrappers. It is assumed that part of the trash that accumulated in the CDS unit over roughly half of the rainy season had decomposed in the unit, hence the absence of paper products. Given the CDS unit was cleaned out after slightly more than nine months of use, it was assumed that this 0.10 square mile urbanized area produced a volume of 64 gallons of trash over one year. This datum will be used as the default value for the implementation plan. Although other studies are informative, studies currently available to the Regional Board provide insufficient data and could not be applied directly to establishing trash generation rates.

The City of Los Angeles conducted an Enhanced Catch Basin Cleaning Pilot Project in compliance with a consent decree between the United States Environmental Protection Agency, the State of California, and the City of Los Angeles. The project goals were to determine debris loading rates, characterize the debris, and find an optimal cleaning schedule through enhancing catch basin cleaning. The project evaluated trash loading at two drainage basins:

- The Hollywood Basin (1,366 acres and 793 catch basins) includes much of Hancock Park and is mostly residential with some commercial and open space, and no industrial land;
- The Sawtelle Basin (2,267 acres and 502 catch basins) includes residential areas with some commercial, industrial and transportation-related uses, and some open space.

The catch basins are inlet structures without a sump below the level of the outlet pipe to capture solids and trash washed down by the stormwater.[17] These inlets also collect trash, grass clippings and animal wastes during dry weather. Catch basins were cleaned 3-4 times from March 1992 to December 1994 and yielded approximately 0.79 yd^3 (160 Gal) of debris per cleaning (Sawtelle – 1.04 yd^3 (210 Gal) and Hollywood – 0.61 yd^3 (123 Gal)), characterized as paper (26%), plastic wastes (10%), soil (33%), and yard trimmings (31%).

The study also observed that the amount of plastic waste was less in residential areas and greater in non-residential areas, that paper waste was greater in commercial areas, and that soil and yard waste was greater in residential areas and open spaces[18].

SECTION 3: NUMERIC TARGET

The water quality indicator, or numeric target, is 0 (zero) trash in the water. The numeric target is EPA and Regional Board staff's interpretation of the narrative water quality objectives. In addition to the Regional Board's efforts, EPA has conducted independent research on the subject of an appropriate

[17] Such structures are usually termed *catchments*, but the term *catch basin* is used throughout Southern California. The absence of flow during dry weather allows trash to collect at the inlet (Phone conversation with Wing Tam, City of Los Angeles, November 10, 1999), as cited in Los Angeles Regional Board 2001a.

[18] This information and all of the above concerning the City of Los Angeles Enhanced Catch Basin Cleaning was found in: City of Los Angeles Department of Public Works, Bureau of Sanitation: Consent Decree Report, Enhanced Catch Basin Cleaning, April 1999 (Unpublished report.), as cited in Los Angeles Regional Board 2001a.

numeric target for trash for the Ballona Creek and Wetland.[19] The guidance, scientific literature, other established TMDLs and related materials that EPA has reviewed support a zero target for this TMDL. The results of the Regional Board's and EPA's research indicate the following:

(1) Trash and debris in waterways, even at a very low level, cause significant impacts on wildlife due to food chain effects such as bioaccumulation. Individual animals can be harmed or killed due to entanglement or ingestion. Nearly a million seabirds are thought to die from entanglement or ingestion of floatable material (e.g. trash) each year. One piece of trash can be lethal: A bird can be become entangled in a six-pack ring; an animal can die of starvation after swallowing a plastic bag[20].

(2) Even a small quantity of trash poses significant impacts on human health. Items such as glass, metal objects, or other dangerous items can cause injury, infection, or illness upon contact[21].

(3) Even a small quantity of trash affects the aesthetic quality of life, which is specifically included in the Basin Plan as an essential part of the non-contact recreational beneficial use (REC-2)[22]. Floating debris is an eyesore, and it has been well documented that coastal communities lose millions of tourist dollars when trash makes their beaches unattractive to visitors[23].

There is an **absolute prohibition** of trash by the City of Los Angeles. This prohibition further supports a zero target. The City of Los Angeles Code states in part "no person shall throw, deposit, leave, cause or permit to be thrown, deposited, placed or left **ANY** refuse, rubbish, garbage or any other discarded or abandoned materials in or on **ANY** street, gutter, storm drain, inlet, catch basin or any other drainage structures so that such materials when exposed to stormwater or any runoff will become a pollutant in the storm drain system."

Although a substantial number of comments were received in response to the Regional Board's March 9, 2000 and June 22, 2001 Draft TMDLs as well as EPA's December 5, 2001 public review draft on the issue of the numeric target, no scientific evidence was presented to support any alternative targets that would fully met the water quality standards and support the designated beneficial uses, nor was either the Regional Board nor EPA able to find any information in the literature which would indicate a "safe" level for trash such that a non-zero target would be appropriate.

Finally, TMDLs must indicate a margin of safety to account for uncertainty. Based on the margin of safety requirement, combined with the lack of evidence of any "safe" level of trash and the persuasive evidence of the significant adverse effects of even a minimum amount of trash, EPA has determined that the numeric target for this TMDL must be zero.

EPA and Regional Board welcome future studies on assimilative capacity of trash for the Ballona Creek and Wetland. If future studies demonstrate that a non-zero loading will not impair beneficial uses, this TMDL could be revised.

The numeric target was used to calculate the Waste Load Allocations as described in Section 5 TMDLs and Allocations and Section 6 Implementation and Monitoring Recommendations.

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[19]USEPA Region 9 2002a, Memo to the File on Literature Search on Trash Numeric Target for Ballona Creek and Los Angeles River Trash TMDLs.
[20] See footnote 10.
[21] See footnote 10.
[22] See footnote 9, Letter from Jill Hill, Coordinator of La Gran Limpieza.
[23] See footnote 10.

SECTION 4: SOURCE ANALYSIS

The major source of trash in the river results from litter, which is intentionally or accidentally discarded in watershed drainage areas. Transport mechanisms include the following:

1. Storm drains: trash is deposited throughout the watershed and is carried to the various reaches of the river and its tributaries during and after significant rainstorms through storm drains.

2. Wind action: trash can also blow into the waterways directly.

3. Direct disposal: direct dumping of trash into the waterways also occurs.

Extensive research has not been done on trash generation or the precise relationship between rainfall and its deposition in waterways. However, it has been found that the amount of gross pollutants entering the stormwater system is rainfall dependent but does not necessarily depend on the source (Walker and Wong, December 1999, as cited in the Los Angeles Regional Board 2001a). The amount of trash which enters the stormwater system depends on the energy available to re-mobilize and transport deposited gross pollutants on street surfaces rather than on the amount of available gross pollutants deposited on street surfaces. The exception to this finding of course would be in the event that there is zero gross pollutants deposited on the street surfaces or other drainages tributary to the storm drain. Where gross pollutants exist, a clear relationship between the gross pollutant load in the stormwater system and the magnitude of the storm event has been established. The limiting mechanism affecting the transport of gross pollutants, in the majority of cases, appears to be re-mobilization and transport processes (i.e., stormwater rates and velocities).

Several studies conclude that urban runoff is the dominant source of trash [24]. Ballona Creek collects runoff from several partially urbanized canyons on the south slopes of the Santa Monica Mountains as well as from intensely urbanized areas of West Los Angeles, Culver City, Beverly Hills, Hollywood, and parts of Central Los Angeles. The large amounts of trash conveyed by urban storm water to the Ballona Creek and Wetland is evidenced by the amount of trash that accumulates at the base of storm drains. The amount and type of trash that is washed into the storm drain system appears to be a function of the surrounding land use.

A number of studies (Walker and Wong, 1999, Allison, 1995, as cited in the Los Angeles Regional Board 2001a), have shown that commercial land-use catchments generate more pollutants than residential land use catchments, and as much as three times the amount generated from light industrial land use catchment. It is generally accepted that commercial land uses tend to contribute larger loads of gross pollutants per area compared to residential and mixed land-use areas. This is in spite of daily street sweeping in the commercial sub-catchment compared to once every two weeks in residential and mixed land use areas.

SECTION 5: TMDLs and ALLOCATIONS

The purpose of this section is to determine the total loading of trash which the Ballona Creek and Wetland can receive without exceeding water quality standards, and to apportion the total among the sources of trash. A TMDL is defined as the sum of the individual waste load allocations for point sources, and load allocations for nonpoint sources and natural background pollutants, such that the loading capacity of the receiving water is not exceeded.

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[24] US EPA Office of Water. (2000) 2nd edition, Volunteer Estuary Monitoring: A Methods Manual - Marine Debris Chapter.

In order to achieve the numeric target of zero, it is necessary for the assimilative capacity for the waterbody and, therefore, the TMDL, which includes Waste Load Allocation and Load Allocation, to also be set at zero.

TMDL = Waste Load Allocation (WLA) + Load Allocation (LA)
0 = 0 + 0

5.1 Waste Load Allocations

Storm drains have been identified as the major source of trash in the Ballona Creek and Ballona Wetland. The Regional Board's implementation plan therefore focuses on reducing the trash discharged via municipal storm drains. Based on the source analysis, the stormwater sources that were identified to be responsible for trash discharge are subject to the stormwater permits, therefore, Waste Load Allocations are assigned to the Permittees and Co-permittees of the Los Angeles County Municipal Stormwater Permit (hereinafter referred to as Permittees) and Caltrans. Because the TMDL is zero, the waste load allocations must be zero for both CalTrans and Municipal Permittees.

Under EPA Phase II Stormwater regulations, separate permits will be written for state and federal facilities. Thus, public educational institutions and military installations will be covered under separate permits under Phase II. The WLAs for these facilities are also zero.

WLA = 0

Based on the Regional Board's implementation strategy, EPA anticipates the TMDL will be achieved in 10 years. EPA endorses the Regional Board's approach to a phased implementation which allows a progressive 10% reduction from a baseline each year for a period of 10 years. At the end of year 10, zero WLA will be achieved. The Regional Board's implementation strategy provides that the baseline WLAs can be determined either using the Default or Refined approaches. Section 6 on Implementation and Monitoring Recommendations as well as the Regional Board staff report (Los Angles Regional Board 2001) contain detailed description of the phased approach. Based on the Regional Board's implementation plan, EPA considers the WLA of zero to be achievable.

5.2 Load Allocations

Based on the source analysis (Section 4), EPA and Regional Board believe the potential trash discharged from areas not subject to NPDES jurisdiction may be less significant in comparison to impacts due to point sources for an urban watershed setting. In addition, trash is defined as anthropogenic litter and thus there is no natural background attributed to trash. However, to the extent that there are nonpoint sources discharges, the total load allocation is determined to be zero.

Similar to the implementation recommendations in the East Fork San Gabriel River Trash TMDL which was established by the State of California in 2000[25], where the impairment is primary from nonpoint sources, EPA endorses management practices designed to prevent deposition of litter in the river. They may include placing "no litter" signs along the watershed, adding more trash receptacles, and conducting more frequent trash sweeps. Cities will continue to enforce litter prohibition ordinances that are already in

[28] California Regional Water Quality Control Board Los Angeles Region, East Fork San Gabriel River Trash TMDL, 2000.

place. EPA also anticipates a renewed commitment from local citizen groups to monitor and cleanup trash impairment in the watershed.

LA = 0

5.3. Margin of Safety

The margin of safety is included to account for uncertainties concerning the relationship between pollutant loads and instream water quality and other uncertainties in the analysis. The margin of safety can be incorporated into conservative assumptions used to develop the TMDL, or added as an explicit separate component of the TMDL.

There is no explicit margin of safety in this TMDL. Rather, as previously discussed, EPA included an implicit margin of safety in setting the numeric target – and consequently the TMDL and allocations – at zero. EPA considers this an appropriate way of dealing with the fact that, on the one hand, there is very little quantifiable data on trash impact on the environment and no such information specific to the Ballona Creek and Wetland, but, on the other hand, there is clear indication in the literature that very small amounts of trash (and in some cases, even one piece of trash), results in significant adverse effects on wildlife, humans, and the aesthetic enjoyment of the waterbody.

5.4. Seasonal Variation and Critical Conditions

The TMDL must describe how seasonal variations were considered. Based on the existing and available information, trash impacts are not always correlated closely with seasonal variations, therefore, the loading capacity (TMDL) of zero and its associated waste load allocations are in effect throughout the year.

The TMDL must also account for critical conditions for stream flow, loading, and water quality parameters. Rather than explicitly estimating critical flow conditions, this TMDL uses a conservative water quality indicator of zero which reflects net effects of trash impairment at all times.

By assuming a zero numeric target regardless the time of the year, EPA implicitly accounts for seasonal variation and critical conditions.

SECTION 6: IMPLEMENTATION AND MONITORING RECOMMENDATIONS

The zero TMDL is expected to be achievable using the current treatment technology as specified in the Regional Board TMDL, along with anti-litter ordinances, and other Best Management Practices measures. Federal regulations require the State to identify measures needed to implement TMDLs in the state water quality management plan (40 CFR 130.6). The main responsibility for water quality management and monitoring resides with the State. EPA fully endorses the State's proposed approach to implementation of the trash TMDL in Ballona Creek and Wetland. The State's implementation measures contain provisions for ensuring that the waste load allocations and load allocations (see Section 5) in the TMDL will in fact be achieved.

EPA expects that the discharge of trash to the Ballona Creek and Wetland will be regulated via the Municipal NPDES Storm Water Permits and the Caltrans stormwater permit. In addition, USEPA Phase II stormwater permits, general permits, and industrial permits may also be used to regulate discharges of trash to the river.

Under 40 CFR 122.44, NPDES permits must be consistent with waste load allocations. The Regional Board will work with the permittees to achieve compliance with these provisions.

6.1 Implementation Recommendation

The TMDL that was adopted by the Regional Board on September 19, 2001 (Los Angeles Regional Board 2001a) and by the State Board on February 19, 2002 includes an implementation plan which is summarized as follows:

6.1.1 Baseline Waste Load Allocation

The Baseline Waste Load Allocations is the Waste Load Allocation which the Regional Board will assign to a permittee before reductions are required. The progressive reductions in the Waste Load Allocation will be based on a percentage of the Baseline Waste Load Allocation.

6.1.2 Interim Allocation Goals based on Default Baseline Method

The Regional Board has calculated a Default Baseline (referred as "Default Baseline Waste Load Allocation" in Regional Board's TMDL) for the municipal stormwater permittees as 11,094 total cubic feet of trash (expressed as uncompressed volume) and 1,635 total cubic feet for CalTrans. This baseline is based on 86 cubic feet per square mile for the municipal permittees and 893 cubic feet per square mile for CalTrans. No differentiation will be applied for different land uses in the Default Baseline Method. The municipal permittee value is based on data provided by the City of Calabasas, as described previously. The CalTrans value is based on findings from a Litter Management Pilot Study (LMPS)[26] by CalTrans. Further details of the studies are included in Los Angeles Regional Board, 2001a.

6.1.3 Interim Allocation Goals based on Refined Baseline Method

Due to several limitations of the studies that the Default Baseline Method is based on[27], the Refined Baseline Method is regarded by the Regional Board as a preferred alternative. Therefore, in its adopted TMDL, the Regional Board also includes the refinement of the Default Baseline Method by implementing an approved "Baseline Monitoring Plan" as option to 6.1.2 (see Los Angeles Regional Board, 2001a). The goal of the Baseline Monitoring program is to derive a representative trash generation rate for various land uses from across the Ballona Creek and Wetland.

6.1.4 Phased Implementation Schedule

EPA endorses the Regional Board's implementation schedule as outlined in Los Angeles Regional Board, 2001a. The phased annual allocation goal (referred as "Waste Load Allocation" in Regional Board's TMDL) represents a progressive reduction in the baseline quantity over an implementation period of 10 years. EPA regards a yearly reduction of 10% based on the refined or default baseline method as interim goals for reaching the Waste Load Allocation of zero at the end of Implementation Year 10.

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[26] California Department of Transportation District 7 Litter Management Pilot Study, June 2000. This study defined litter in stormwater as "manufactured items that can be retained by ¼-inch mesh made from paper, plastic, cardboard, etc.", and "that are not of natural origin (i.e. does not include sand, soil, gravel, vegetation, etc.)" (p. 1-2), as cited in Los Angeles Regional Board 2001a.

[27] USEPA Region 9 2002b, EPA's Summary of Comments and Responses on the Los Angeles River Trash TMDL and Ballona Creek and Wetland Trash TMDL.

6.1.5 Implementation Strategies

EPA recommends the implementation strategies in the Regional Board's TMDL (Los Angeles Regional Board 2001a). They include end-of-pipe full capture structural controls, partial capture control systems and institutional controls. Institutional controls include adding more trash receptacles, and conducting more frequent trash sweeps. Cities will continue to enforce litter prohibition ordinances that are already in place. The Regional Board strategy also relies on a renewed commitment from local citizen groups to monitor and cleanup trash impairment in the watershed.

6.2. Monitoring Recommendation

6.2.1. Baseline Monitoring

EPA endorses the goal of collecting representative data from across the watershed that can be used to refine the default loading that was outlined in the Regional Board staff report (Los Angeles Regional Board 2001a), especially given the limitations of the basis of the default baseline method [28]. EPA also supports the Regional Board's proposal to establish minimum requirements for the Baseline Monitoring strategies which are as follows:

- The plan would provide representative data from across the watershed.
- The plan would provide data in units that were easily reproduceable and would be comparable with data to be collected during the Implementation Phase
- The permittees agreed that Baseline Waste Load Allocations would be derived from data generated from the plan.

EPA supports the proposed Baseline Monitoring requirements and milestones dates as proposed by the Regional Board in Los Angeles Regional Board 2001a.

6.3 Compliance Determination Recommendation

EPA supports Regional Board's proposed approach to measuring compliance with the TMDL (Section VIII in Los Angeles Regional Board 2001a).

SECTION 7: PUBLIC PARTICIPATION

The State and EPA have provided for public participation through several mechanisms. The Regional Board conducted several public workshops and numerous workgroup meetings during the draft of this TMDL. The Regional Board also held meetings with representatives of a number of stakeholder groups, including the Los Angeles Department of Public Works, City of Los Angeles, City of Long Beach and Caltrans. The above activities were conducted jointly with the Los Angeles River Trash TMDL efforts. The Regional Board has provided two formal opportunities for public comments on the draft TMDL (March 2000 and June 2001). Regional board staff have responded to the public comments and the associated documentation is included in the Regional Board's administrative record. EPA has reviewed Regional Board's responsiveness summary. EPA's TMDL is based on and generally consistent with the TMDL which was adopted by the Regional Board on September 19, 2001and by the State Board on February 19, 2002. EPA provided public notice of the draft TMDL and solicited public comments by

[28] USPEA Region 9 2002b, EPA's Summary of Comments and Responses on the Los Angeles River Trash TMDL and Ballona Creek and Wetland Trash TMDL.

placing a notice in the Los Angeles Times. EPA carefully considered all comments received during the comment period, and has prepared written responses to all comments on this TMDL received by EPA through the close of the comment period January 15, 2002 (EPA Region 9 2002b).

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